Trains

December
1943

25¢

Great Northern articulated. See pages 26 and 28.

December, 1943

Trains

Volume 4 Number 2

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THE perennial Southern freight rate controversy is again before Congress and in the public press. The complaint has always been that the South is handicapped in shipping to Eastern and Northern markets by freight rates proportionately higher than those charged other sections.

Freight rates are very complicated, the rate structure being based on the principle of making the most traffic move. Part of every rate covers the out-of-pocket cost of moving that particular traffic, and part of the rate covers the general overhead of the railroad. On some types of traffic—as, for instance, dairy products—the value of the product is so high in proportion to the freight that a rate can be charged which is considerably above the out-of-pocket cost, and this helps to make up for much, much lower rates on heavy, low-value commodities such as coal, on which the rate must be little more than the bare out-of-pocket cost if the commodity is to move at all.

All these varying rates are listed in two general types of tariffs: class and commodity. The class rates divide all goods into first, second, third class, and so on, with corresponding charges. The commodity rates are exceptions to the more general class rates, and are set up wherever the volume of traffic warrants a charge more especially adapted to the flow of business, or even to the business which might flow if the rate were right. Thousands of these commodity rates have been set up, excepting the vast majority of traffic from the general class rates.

All this complicated rate structure has been developed by cooperation between railroads and shippers, with the idea of creating and moving the greatest volume of traffic. The I. C. C. and state rate commissions have acted as umpires in the public interest. Out of all the class and commodity rates, cases can be picked to prove any point whatsoever. In a general way Southern class rates are higher, but this is balanced by more and lower commodity rates, designed to encourage the development of Southern industry. Few shippers are supporting a change in rates.

Now Congress proposes by legislative action to compel uniform freight rates, based upon mileage. The intent is to lower the Southern class rates, but no mention is ever made of the fact that commodity rates would have to come up or service would suffer by loss of revenue. But the biggest blow to our economy, and mostly to the South itself, would be legislative tinkering with the complicated rate structure which has been built up over a period of years on the principle of encouraging traffic in the area served by each particular railroad. Political rate-making would be substituted for competitive rate-making under I. C. C. supervision.

Eastern railroads will no longer make either coach or Pullman reservations for more than 30 days in advance.

Abandonment proposals before the I. C. C. include the branch of the SP from Truckee to Lake Tahoe, over which thousands of tourists have traveled, and the complete Chicago, Attica & Southern Railroad, presently 62.7 miles but only recently a 154.04-mile connecting road in Indiana with operating revenues of almost $300,000 annually.

The Boston & Maine recently put in service the first of its 12 new 5400-horsepower Diesel freight locomotives, and set up a new record by running right through nonstop for the 186 miles from Boston to Mechanicville, N. Y. The train was 125 cars, 3839 actual tons. No helpers were needed on grades and the electrics were not coupled on through the Hoosac Tunnel.

The Chesapeake & Ohio has converted four baggage cars to temporary wartime diners. To simplify both the conversion and postwar reconversion, windows were cut only in the kitchen end. Tables and benches are arranged in soda fountain booth style so that 56 passengers can be served at one sitting, compared with 48 persons in the usual large diner.

A. C. Kalmbach.

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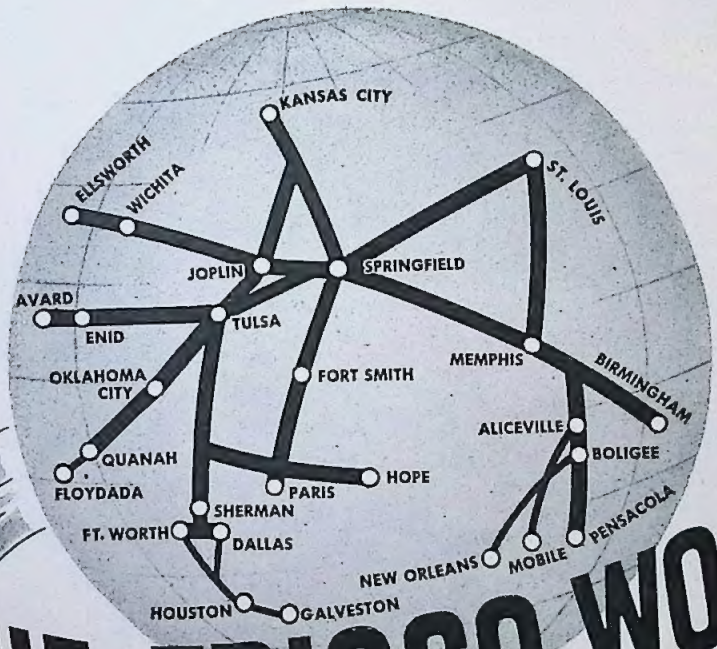

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ties are notably increased to effect substantial further reductions in operating costs. Quicker freight and passenger services probably need not be sought through materially higher maximum speeds than those now attained by the fastest trains of both services, but all intermediate speed-restricting conditions must be banished, and delays due to meeting and passing trains must be greatly reduced in order that the average operating speed of through freight and passenger trains over entire engine districts will closely approach the maximum permissible. Grades on principal lines, except on mountain crossings, must also be reduced to such easy ascents that these maximum speeds can be continuously maintained by 1200-ton passenger trains and 6000-ton freight trains. Only in this way can future rates and fares produce the high train-mile earnings which alone will permit the property improvement necessary to hold and develop traffic, especially in the face of the bitter rivalry of competitive transportation agencies which will surely have been improved, strengthened and multiplied by the industrial development caused by this war.

The basic reason for building railroads is to provide superior means of overcoming friction and gravity, which are the two principal natural forces opposing movement of vehicles in inland transportation. Efficient railway operation depends upon reducing these resistances to the minima economically justifiable and then producing, with the greatest possible efficiency, the tractive forces necessary to overcome them and applying this hauling power with maximum effectiveness. The principal component of operating expense being the train-mile, it has followed that the underlying principle of successful railway management has been to produce all of the transportation required in a minimum number of train-miles. Direct lines, with low grades, minimum total curvature and all curves of long radius, and track and structures designed to the standard needed to carry maximum loads at maximum speeds with complete safety and minimum maintenance costs, comprise the fundamental factor in railway economics. A second factor is locomotives of appropriate horsepower and superior fuel and maintenance economy, while a third is adequacy of route and yard capacity and appurtenant facilities. Together these permit trains of heavier load to be operated continuously at the maximum speeds, and enable all terminal services, for trains and engines, to be performed expeditiously and economically.

Similar considerations concerning car design and construction are also a part of the super-railroad picture. In the future the economies which can be obtained from very large freight cars, more heavily loaded, should be the controlling determinant of their dimensions, which probably should closely approach those of modern passenger equipment. Shipper cooperation should be sought by rate-making practices which will share the resulting operating savings with the patrons who help obtain them. This will provide the most practical encouragement to efficient car utilization and remove the tendencies of competition to decrease car loads. Containers offer the means of reconciling the wishes of shippers for smaller shipping units with the transportation requirements which underlie more economical operation. Further development of the container should also be sought to lessen the expense of packing for shipment by rail.

The somewhat indefinite term "appropriate horsepower," which has been used in reference to locomotives, may be defined as the locomotive of the smallest horsepower necessary to move, in single-engine trains, an average day's traffic based on minimum frequency of dispatching and the operating speeds required by competitive conditions. The theoretically desirable "appropriate horsepower" for moving all traffic on minimum frequency could, for heavy tonnage or heavy grades, require an engine of impossible size; and the upper limit must of course be established by such practical considerations as clearances, bridge and curve limitations, allowable drawbar pull which can be transmitted by the draft gear and couplers, the length of sidings on single-track lines, the maximum-length train which can be safely controlled with the conventional airbrake equipment, and by the size of turntables, enginehouses and shops.

Grades and curves are a principal ingredient of the railway problem because these introduce the increases in the operating costs and the speed limitations which together make railroad traffic vulnerable to competition. While grades and curves, like death and taxes, will always remain, the more they can be reduced the fewer difficulties the railway will have. In the long run it is preferable to reduce or eliminate grades and curves where economically feasible to do so, and thus remove for all time the ad-

ditional resistances which they interpose against train movement, than it is to ease the burden of these handicaps by massing greater locomotive forces to combat them. Of course it is necessary to use the latter alternative when traffic lacks sufficient density to justify the invariably greater capital cost of the superior roadway. The elimination of adverse physical characteristics on heavy-traffic routes, followed by the use on such lines of super-power locomotives of maximum capacity, is the most effective method of securing low-cost operations—provided, of course, that the capital expenditures necessary for the line improvements are justifiable and that the required funds can be obtained. Low grades and easy curves should not be looked upon as a means of avoiding the necessity of using locomotives of maximum horsepower, but as the way to secure maximum trainloads and speeds from such engines. It should therefore be the goal of intensive development of primary routes to obtain minimum grades and curves and maximum locomotive power so that the full benefits which each can confer upon future operations will be simultaneously and permanently obtained. Low grades and super-power locomotives are the "victory" combination for the American railroads.

Railways in this country were generally built to original physical characteristics of one per cent grades and six-degree curves, or slightly higher, save where favorable topography permitted better alinement with no important increase in original construction costs. On mountain lines, much heavier grades and sharper curves were, of course, unavoidable. In view of the limited capital initially available and the very light traffic usually in sight at the outset, these engineering standards were sound practice then, but now they cause too-heavy operating expenses for satisfactory mainline operations. The laying of additional tracks on the heavier-traffic sections in past years permitted a considerable amount of improvement in profile and alinement, but the railways of the United States still have on their primary routes too small a proportion of engine districts on which ruling grades are 0.5 per cent or less and on which curvature and bridge limitations do not introduce frequent restrictions in normal operating speeds. Within the decade after the end of the present war, competition will necessitate such fast and low-cost operations that it will be imperative to develop the main lines so that

What of the future?

By Ernest E. Norris, President, Southern Railway System.
(From an address before the Western Railway Club of Chicago.)

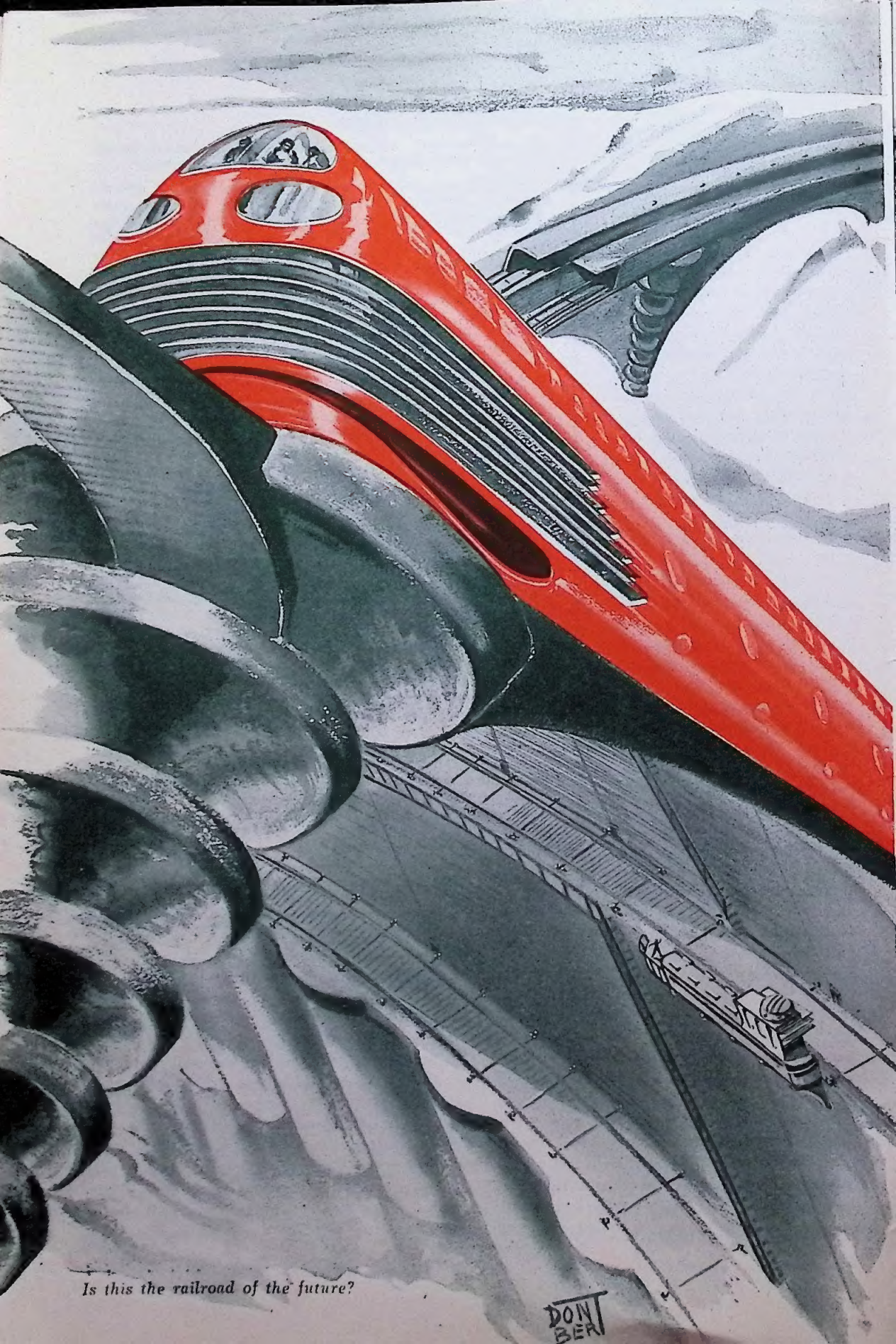
If we hope to compete successfully in the years to come for high-class freight, for passenger travel, for the mail and express tonnage of the nation, we've got to apply imagination to every operation, every facility, every method of doing business. We've got to free our minds of all the venerable do's and don'ts that circumscribe our thinking. We've got to tear ourselves out of the rut of rigid behavior patterns. We've got to mark many a sacred cow for slaughter. We've got to apply modern yardsticks to everything we do and say and think in this business of railroading. We've got to rid our house, from top to bottom, of obsolete concepts, beliefs, convictions. And we've got to furnish it anew—with imagination. We either do these things, or we must be content for the rest of time with the dreary job of handling mostly bulky commodities.

★ ★ ★

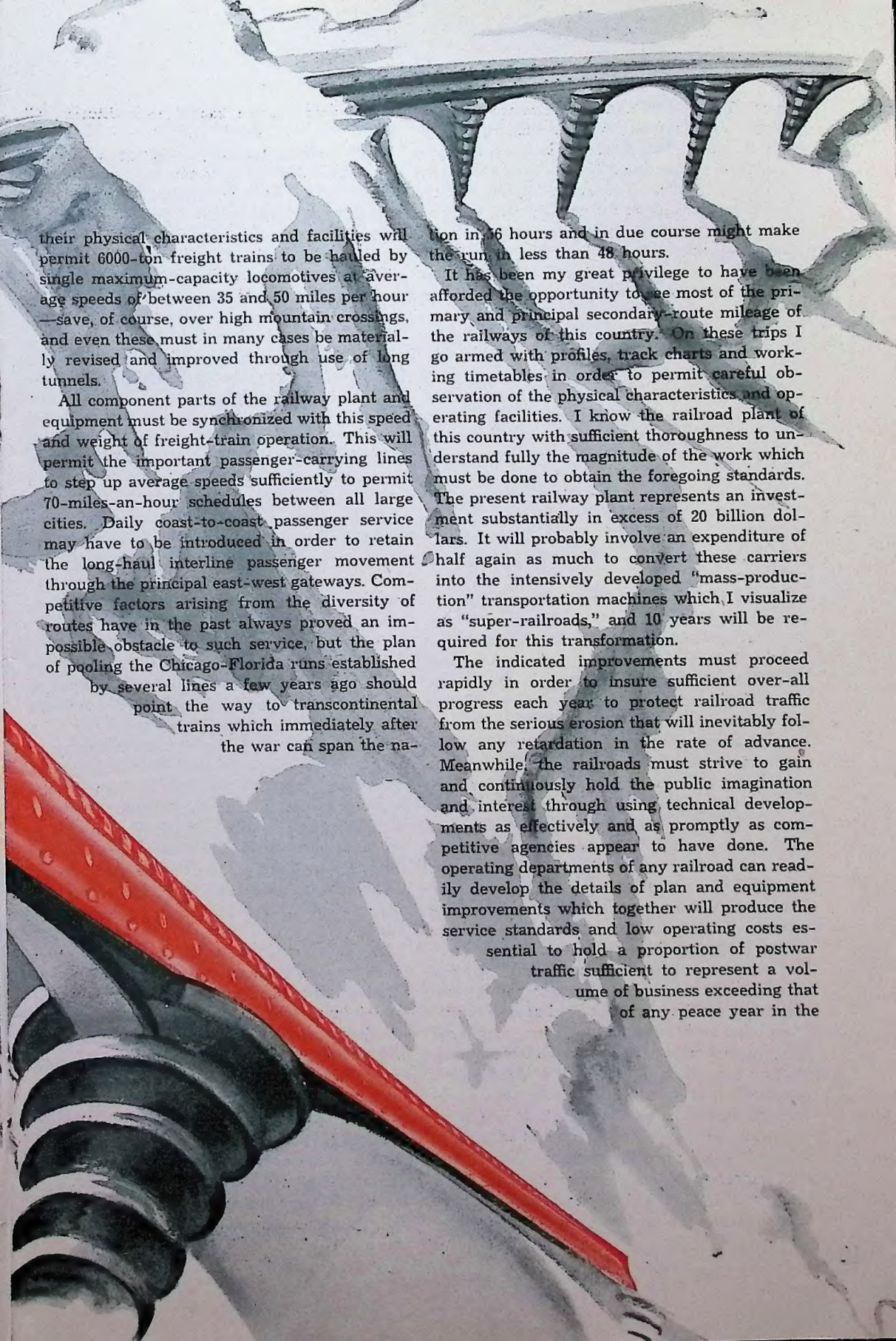
Our airline competitors, when they day-dream about cargo carriers, make a great deal out of their natural asset of speed —in the air. But imagination quickly takes that one apart. It finds that, except for longer hauls, speed in the air doesn't mean so much after all; that it's the elapsed time from receipt to delivery of freight that counts. It finds that the admitted advantage of fast transit by air is materially trimmed down by the necessary remoteness of most airfields in relation to industrial and business centers, as compared with the "downtown" industrial sidings and team tracks of the railroad.

But imagination would never stop with these slightly comforting thoughts. It would promptly find out how much, and what part, of the available freight business could pay the higher charges of air transport, for speed alone. It would find out how close the railroad could come to matching the elapsed time of air deliveries, not in transit hours alone but in the more important hours of working days. It would find out how much of a factor continuous chain delivery was, knowing that, in most cases, speed is secondary to dependability after the first of a flow of deliveries.

Armed with these facts, imagination would then create a fast service to meet the real needs of most of the shippers and receivers of freight. It would follow up by devising a modern selling technique in which the economy and dependability of rail transportation would be emphasized, to offset the air line's advantage in speed. The result undoubtedly would be to hold to the rails a large part of the tonnage that might otherwise be glamorized into the air.



Is this the railroad of the future?



their physical characteristics and facilities will permit 6000-ton freight trains to be hauled by single maximum-capacity locomotives at average speeds of between 35 and 50 miles per hour —save, of course, over high mountain crossings, and even these must in many cases be materially revised and improved through use of long tunnels.

All component parts of the railway plant and equipment must be synchronized with this speed and weight of freight-train operation. This will permit the important passenger-carrying lines to step up average speeds sufficiently to permit 70-miles-an-hour schedules between all large cities. Daily coast-to-coast passenger service may have to be introduced in order to retain the long-haul interline passenger movement through the principal east-west gateways. Competitive factors arising from the diversity of routes have in the past always proved an impossible obstacle to such service, but the plan of pooling the Chicago-Florida runs established by several lines a few years ago should point the way to transcontinental trains which immediately after the war can span the nation in 36 hours and in due course might make the run in less than 48 hours.

It has been my great privilege to have been afforded the opportunity to see most of the primary and principal secondary-route mileage of the railways of this country. On these trips I go armed with profiles, track charts and working timetables in order to permit careful observation of the physical characteristics and operating facilities. I know the railroad plant of this country with sufficient thoroughness to understand fully the magnitude of the work which must be done to obtain the foregoing standards. The present railway plant represents an investment substantially in excess of 20 billion dollars. It will probably involve an expenditure of half again as much to convert these carriers into the intensively developed "mass-production" transportation machines which I visualize as "super-railroads," and 10 years will be required for this transformation.

The indicated improvements must proceed rapidly in order to insure sufficient over-all progress each year to protect railroad traffic from the serious erosion that will inevitably follow any retardation in the rate of advance. Meanwhile, the railroads must strive to gain and continuously hold the public imagination and interest through using technical developments as effectively and as promptly as competitive agencies appear to have done. The operating departments of any railroad can readily develop the details of plan and equipment improvements which together will produce the service standards and low operating costs essential to hold a proportion of postwar traffic sufficient to represent a volume of business exceeding that of any peace year in the

past. The sole obstacle to transforming these projects into actualities is the difficulty of paying for them. This matter of securing adequate capital generally has been the entire "railroad problem" of past decades. It follows that the public importance of satisfactory railway earnings largely results from the relationship between earnings and credit and capital. All railroad development is founded upon the latter, and it is wholly dependent upon the two former factors.

Capital is money used for productive purposes and represents either income withheld from present security holders for reinvestment in the property, or money obtained from new investors upon the credit of the company. Credit, in turn, represents the faith which investors have that the money which they entrust to an enterprise will be utilized so as to produce an operating profit out of which reasonable rates of interest or dividends can be paid regularly while reserves are continuously being provided to restore the service life which is being worn out of capital assets.

For a variety of reasons which are not pertinent here, the capital which produced the railway systems fared badly during the decade of the '30's. Few companies could continuously obtain new funds on satisfactory terms, except through the sale of equipment-trust certificates to finance purchases of cars and locomotives on the instalment plan. The resale value of the property acquired, rather than the credit of the purchaser, is the essential factor in this arrangement. Unfortunately, no financial device is available to raise funds for fixed improvements with equal facility. These must be paid for out of surplus earnings or money raised on the credit of the enterprise.

Measuring the results of the period beginning January 1, 1930, more capital went out of the railroad industry than came into it; "on balance" the railroads disbursed more cash, derived through undistributed earnings, to pay off former investors than they obtained as new capital from other investors. The industry, considered as a whole, has been limited in its development to the cash which it produced as depreciation charges—or, in other words, to the very gradual replacement of existing plant. It is a great tribute to railroad management that with these relatively small sums the carriers accomplished such important developments of their plant and equipment since 1929. This should place in better perspective the vitalizing effect which wholly adequate future capital expenditures will have.

Last year's net railway operating income was 1½ billion dollars. Unfortunately, this must be regarded as a wartime "windfall." One dare not predicate postwar railway development on a continuation of such earnings. However, if one billion dollars of sustained annual net railway operating income can be retained, through all postwar years, it, together with the "other income" derived from nonoperating sources, will service a capitalization reasonably commensurate with the investment which produced the American railway system. The resultant income available for leased-line rentals and fixed and contingent bond interest will provide a sufficient margin of safety for the payment of these charges to permit securities on which they were paid to sell around par. A balance of more than 600 million dollars will remain after such disbursements to allow moderate dividend payments and provide over three million dollars annually needed for reinvestment in the property out of surplus earnings. This will represent one-third of the yearly total needed over a decade to produce "super-railroads."

A like amount will be derived from depreciation charges which are now mandatory on specified portions of the fixed plant and structures, as well as on cars and locomotives. These funds provide cash for capital purposes in amounts offsetting the estimated service life lost through action of the elements and wear and tear of traffic, and are deducted directly from income as an operating expense. Serial equipment-trust certificates are usually paid off by using funds produced through the equipment depreciation charges, and thereby the debt incurred to buy the equipment is gradually extinguished by the depreciation charges against this same equipment.

To the extent that equipment depreciation funds are used to amortize equipment-trust certificates rather than make direct payments on capital improvements, usually equipment, the benefits of current depreciation accruals have, in effect, been anticipated by having obtained the equipment in advance of the date when the money to pay for it was obtained out of revenue. Equipment depreciation funds are generally utilized in larger amounts to liquidate debts against equipment acquired previously than to make fully paid purchases of new units. This practice may be expected to continue in the future, and equipment depreciation funds will be used

more to liquidate prior purchases than to pay for future ones. Fortunately, the problem of financing adequate numbers of new cars and engines through sale of equipment-trust certificates presents no serious difficulties.

The development of the railway fixed plant represents the larger capital requirement and also presents the principal financial questions. Over the next 10 years, in excess of three billion dollars of new capital must be invested, in approximately equal proportions each year, to supplement the funds provided by surplus earnings and either depreciation charges or sales of equipment-trust securities. While for the first few years most of this last third of the total requirements will have to be raised through the sale of bonds, the financial benefits of the improvements thus made possible will so strengthen earning power and improve credit that financing by sale of stock should thereafter be feasible on a large scale. The acquisition of funds on a stock-ownership basis will be the final test and evidence of the success of "super-railroads."

Existing junior issues of bonds must sell around par before new ones will be bought by investors, but stable earning power of one billion dollars per year will soon restore the credit of the American railways and reestablish the value of their bonds. In due course the continuance of satisfactory earnings—one billion dollars per year in postwar periods—with resultant freedom from the hazards of reorganization and a gradual increase in the number of companies restoring and maintaining dividends, will open up capital markets to the sale of new issues of railway bonds and stocks and will provide the final third of the annual billion-dollar capital requirement. During the first postwar year or two, lingering public skepticism over railway credit may prevent the necessary total additional new capital from being acquired through security sales. During that period, such deficiencies in available new capital must be made up out of the cash surpluses now being accumulated in railway treasuries. It is very important that taxes shall not impose too heavy a handicap on the creation of these funds; and such future drafts for capital purposes on cash resources place a limit on the extent to which present surplus earning power should be monopolized by debt-reduction programs, notwithstanding the attractiveness of purchasing bonds at large discounts.

No amount of capital expenditure will enable a railroad train to operate at airplane velocities, but the operating speeds of "super-railroads" will represent entirely satisfactory schedules for journeys of all lengths, especially when combined with the comfort that will be offered by postwar equipment and with extension of the convenience of through cars and through trains between additional combinations of distant major cities. The unit costs of "super-railroads" will permit such competitively attractive fares, for Pullman as well as coach passengers, that these price advantages, combined with service adequately reflecting the wishes and needs of the traveling public, will give the railroads increasing, rather than declining, passenger traffic over future decades.

"Super-railroads" will also permit these carriers to provide freight schedules representing 35-miles-an-hour service on a basis of elapsed time from initial to final terminal, and yard switching requirements will add a minimum number of hours to the road-haul time. Train loads will approximate water cargoes in tonnage, and direct-movement costs will be of similar amounts. Highway freight transport will lose, rather than gain, in proportional commercial transportation importance when "super-railroads" recover the advantage of both price and speed and are, of course, fully supplemented by coordinated motor terminal and local services to the extent necessary.

In both freight and passenger service, winning combinations of speed and price can be found that will insure "super-railroads" permanent and profitable retention of two-thirds or more of the internal commercial transportation of the United States.

The cost appears large, but represents only 50 per cent of the present investment; and it will be distributed over an adequate period of years to hold the annual capital requirements within limits that can be provided entirely from the industry's own revenues and private sources of new capital. Everything is relative; and the sum of 10 billion dollars required to provide "super-railroads" is but a fraction of the sum that would be necessary to provide superhighways, waterways, and airlines of much less capacity and aggregate public utility.

The railroads can no more afford to refuse to pay the aggregate 10-billion-dollar cost of converting their plants into "super-railroads" than this nation can afford not to pay the price of winning this war—for there is no alternative to Victory.

A Portfolio of Railroad Pictures

Wendell H. Kinney.

Wendell H. Kinney, 2525 E. 49th St., Los Angeles 11, Calif.

Action on the Southern Pacific.

The Southern Pacific relies heavily on modern high-horsepower steam locomotives for both passenger and freight service. The cab-forward articulated locomotives are a breed peculiar to SP lines, and were designed to give enginemen a better view on mountain curves and to put the crew ahead of the smoke in snow sheds and tunnels. No. 4189 is one of the more recent of these intriguingly different engines and is shown pulling a heavy freight over San Gorgonia Pass between the Imperial Valley and Los Angeles.

The bright red and orange *Daylights* set a new standard of passenger-train service in the highly motorized territory between Los Angeles and San Francisco and proved that railroad economy and comfort can bring traffic back to the rails. The third series of *Daylight* 4-8-4 locomotives, with their double headlights, are among the more attractive of the many streamlined versions of the iron horse. With 80-inch drivers for speed, and boosters to help get under way and to assist in climbing the many tough grades, they make creditable schedules for the mountainous terrain through which they operate. Train No. 98, at left, is the *Daylight* from San Francisco to Los Angeles, photographed south of Santa Barbara. The 48 *Daylight* locomotives serve on many a fast freight in addition to their passenger assignments.

Linn H. Westcott.

"The railroad terminal is the city gate. Without, it rises in the superior arrogance of white granite, as an architectural something. It has broad portals, and through these portals a host of folk both come and go. Within, this city gate is a thing of stupendous apartments and monumental dimensions, a thing not to be grasped in a moment. In a single great apartment—a vaulted room so great as to have its dimensions run into distant vistas—are the steam caravans that come and go. It is a busy place, a place of an infinite variety of business."

—*Edward Hungerford in The Modern Railroad.*

A. C. Kalmbach.

Train sheds.

The vaulted trainshed of Chicago & North Western's lakefront station in Milwaukee is at left, while above is the Louisville & Nashville's *Pan-American* arriving under the big arch of the Nashville station which L&N shares with the NC&StL.

B. Thompson, 3463 Richmond Blvd., Oakland, Calif.

These photos were taken at the same place just a year apart. In 1941 the Southern Pacific's subsidiary, Interurban Electric, abandoned its suburban electric railways in the San Francisco Eastbay area, and some of the routes were taken over by the competitive Key System. Now light two-car articulated Key units (bottom photo) operate over much track which formerly knew the weight of the large, heavy Interurban Electric cars (top photo). The IER cars are still in use to ease wartime congestion on Pacific Electric lines around Los Angeles.

San Francisco Eastbay Electric Railroads

William Edward White, 6107 Holway St., Oakland, Calif.

The Key System routes are designated by letters, prominently displayed on the car front ends. This is the B route at Sunnyhills Road station in Oakland. The lines all converge on the Oakland end of the Bay Bridge, over which they run directly into the downtown San Francisco suburban terminal. Both bridge and terminal are very efficiently signaled for close headway, with cab signals. Should San Francisco reach a density of suburban traffic comparable to New York, the bridge railway and terminal will be invaluable.

A light Pacific helps Diesel-powered *El Capitan* of the Santa Fe up the 2.2 per cent eastbound grade of Cajon Pass, some 80 miles east of Los Angeles. The Santa Fe runs two twice-a-week streamliners between Chicago and Los Angeles, *El Capitan* exclusively for coach passengers and the *Super-Chief* for Pullman passengers only. Westbound the two trains run 15 minutes apart, but eastbound they are half a day apart, *El Capitan* making an early-morning arrival in Chicago while the *Super-Chief* arrives after lunch, in time for the Eastern connections.

Reading Pacific No. 105 pulls a New York-Philadelphia express over the route operated jointly by the Reading and the Central Railroad of New Jersey. Headliner of this service is the streamlined, steam-powered *Crusader*.

W. R. Osborne, 2878 Nottingham Way, Trenton, N. J.

H. Sullivan, Placentia, Calif.

Both photographs, Harold M. Lambert, 2601 Cheltenham Ave., Philadelphia, Pa. Copyright.

The smokiest, dirtiest place on a railroad is the engine terminal. But because the locomotive personifies the railroad to most people, the roundhouse would easily top any popularity poll, and, as shown by these photos at West Philadelphia on the Pennsylvania Railroad, the engine terminal is extremely photogenic. The roundhouse itself is not so much a garage for locomotives as a place for light repairs, and in these days of heavy traffic the railroads are turning locomotives so fast that none of them tarry in roundhouses any longer than absolutely necessary to keep them in first-class operating condition.

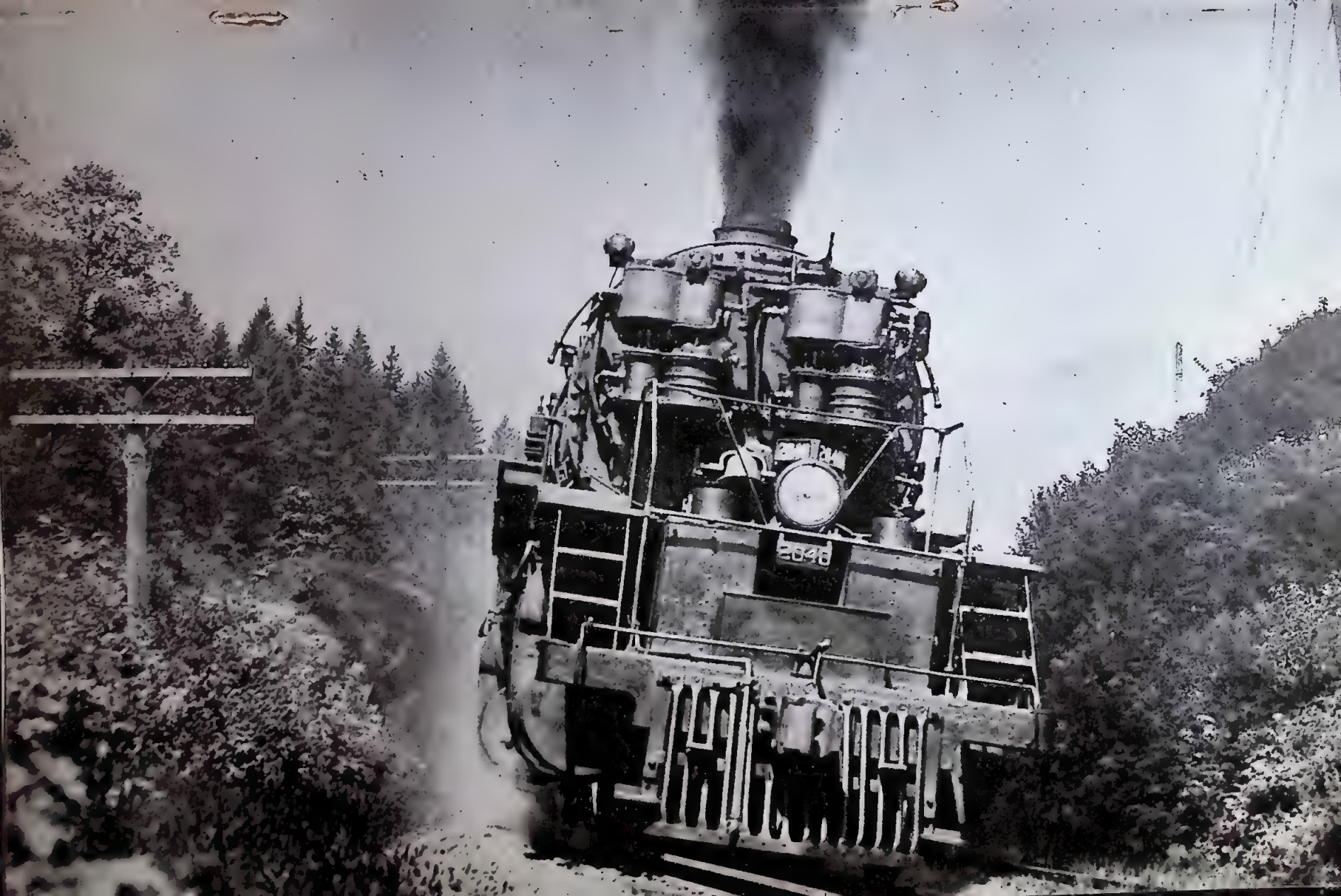
R. H. Kindig, U. S. Army.

Traffic has boomed over the mainline railroads of the West, now bearing the brunt of supply transportation for the Pacific war. Both the Moffat and Royal Gorge routes of the Denver & Rio Grande Western are primary east-and-west transcontinental railroads and have been handling such an extraordinary volume of traffic that some Norfolk & Western Mallets have been purchased to help out with the rush. Above are two of the Grande's own Mallet compounds, 2-8-8-2's Nos. 3404 and 3410, pulling the *Ute*, fast freight, on the Moffat Route near Plainview, Colo.

Jim Morley, U. S. Army.

S. A. Smith, U. S. Army.

Colorado is not only a land of main lines conquering the Continental Divide, but of small lines, many of them narrow-gauges reaching up into the mountainous country which would be unprofitable for standard-gauge railroads. Such a narrow-gauge is the Rio Grande Southern, whose 172 miles serve a large area in the southwestern part of the state. Passenger, mail and express are carried on motor cars ingeniously assembled in the road's shops and called *Galloping Geese*. One of the *Geese* is shown at left on the upper level of the spectacular Ophir Loop. Notice the lower-level track in the bottom of the valley. Above is a typical Colorado shortline scene on the now-abandoned Crystal River & San Juan.



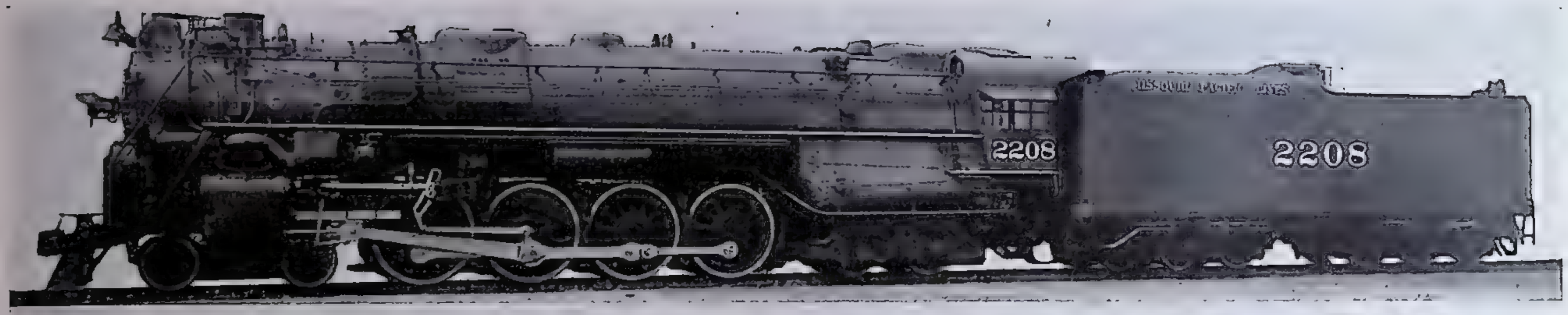
W. R. McGee, U. S. Army. Cover and center photo by S. B. Hertz, 4229 Sunnyside Ave., Seattle 3, Wash.

Class	M-2	N-3	R-1	R-2	Z-6
Type	2-6-8-0	2-8-8-0	2-8-8-2	2-8-8-2	4-6-6-4
Road numbers (M-2 not consecutive)	1951-1984	2000-2024	2030-2043	2044-2059	4000-4001
Tractive force, pounds	95,000	108,400	137,088*	146,000	104,500
Cylinder diameter and stroke, inches	22 x 32 front 23½ x 32 rear	4-22 x 32	4-28 x 32	4-28 x 32	4-23 x 32
Driver diameter, inches	55	63	63	63	69
Weight on drivers, pounds	384,000	459,200	532,800	544,000	436,000
Weight of engine, pounds	403,000	489,200	594,940	630,750	621,000
Weight of engine and tender, pounds	588,100	863,700	919,440†	1,003,530	1,004,800
Steam pressure, pounds	210	275	225‡	240	250
Grate area, square feet	78	95	108	126	152
Evaporative heating surface, square feet	5240	5782	7161‖	7947	5832
Tender capacity: Gallons of water	10,000	21 500	17,000§	22,000	20,000
Tons of coal or gallons of oil	15	5700¶	5800	5600	6000

* Nos. 2030-2033, 128,400 lbs.
† Nos. 2035 and 2038, 921,500 lbs. Nos. 2040-2043, 967,720 lbs.
‡ Nos. 2030-2033, 210 lbs.
‖ Nos. 2030-2033, 6963 sq. ft.
§ Nos. 2035 and 2038, 17,500 gals. Nos. 2040-2043, 22,030 gals.
¶ Nos. 2001, 2002, 2010-2012, 2014, 2015, 2018, 2020, 2021, 2023, 2024, 24 tons coal.

Great Northern Articulateds.

LIKE most roads operating in rough country, the Great Northern has quite a fleet of articulated locomotives, some of which are used in the Lake Superior iron country (No. 2018 above is leaving Superior, Wis., for the range with 175 empties) and others in the Rockies. The specifications for the Great Northern's 70 articulateds are at left. All of these are products of the road's shops except the M-2's (which were built by Baldwin in 1910 and changed from compound to simple by the Great Northern in 1926-27), the first four R-1's (Baldwin-built in 1925), and the Z-6's (built by American Locomotive Company in 1937).



4-8-4 Cousins

THE similarity in basic specifications between the Missouri Pacific's 15 new Baldwin-built 4-8-4's and the latest (1800-series) 4-8-4's of the Denver & Rio Grande Western is no accident. The War Production Board has asked railroads to avoid new locomotive designs so as to save engineering and patternmaking time, so when the MoPac went shopping for more 4-8-4's and found that the D&RGW's 4-8-4's were practically twins to the MoPac's 2100 series [TRAINS, May, 1942], it lost no time in accepting the WPB's suggestion of duplicating the Rio Grande design with certain modifications. Use of blueprints prepared by Baldwin in 1938 for the Grande, together with reuse of numerous patterns, saved hundreds of man-hours and a great deal of material.

The design and manufacture of locomotives has never trended toward standardization, not because the engineers of each railroad believe they can outdesign others but because each group of engines is intended to do a specific job, and because the various parts of locomotives are constantly being improved. Such factors as grade, curvature, clearance, bridge capacity, fuel availability, train tonnages, schedule speeds, and others must be jigsawed into a composite pattern which generally means an entirely new design whenever the purchase of new locomotives is contemplated. Thus when roads are able to get together on using the same general designs, as has happened in a number of other cases recently, it is the exception to the usual practice, and it is no wonder that even on the same basic specifications many minor changes are made, so that in exterior appearance the MoPac 4-8-4's look quite different from their Rio Grande cousins.

Specifications:

	M.P.	D&RGW
Road classification	N-73	M-68
Road numbers	2201-2215	1800-1804
Date built	1943	1938
Tractive effort, pounds	67,200	67,200
Cylinder diameter and stroke, inches	26 x 30	26 x 30
Driver diameter, inches	73	73
Weight on drivers, pounds	279,400	270,172
Weight on pilot truck, pounds	84,115	85,837
Weight on trailing truck, pounds	115,485	114,351
Weight of engine, pounds	489,000	470,360
Weight of engine and tender, pounds	843,000	873,360
Steam pressure, pounds	285	285
Grate area, square feet	106	106
Evaporative heating surface, square feet	5318	5506
Tender capacity: Gallons of water	10,350	20,000
Tons of coal	20	20

George A. Vargo, Benton Harbor, Mich.

Twentieth Century Limited at Whiting, Ind., January, 1923.

Louisville & Nashville's No. 3, afternoon local to Montgomery, loads mail at Calera, Ala., 34 miles south of Birmingham. The fireman is letting the water run from a spout on the left-hand side of the track. Calera is a junction point with the Southern and with an L&N branch. The L&N main line is one of the principal arteries of north-south traffic between the Ohio River Valley and Nashville, Birmingham, Montgomery, Pensacola, Mobile, New Orleans, and Florida.

A. C. Kalmbach.

Kent Day Coes, Montclair, N. J.

Once planned as part of a trunk line from New York to the Great Lakes, the New York & Greenwood Lake Railway has for many years been a unit of the Erie's network of commutation lines running out of Jersey City. It crosses the range of high hills which runs the length of northern New Jersey at Great Notch, where the Caldwell Branch leaves the main line and skirts the edge of the hills. In this photo the main line is at the left and the branch is in the foreground. They run parallel for almost a mile at increasingly divergent levels. The train is No. 507, a mid-morning local bound for Midvale, now the end of the line since the upper few miles have been abandoned. Such slack-time traffic is usually handled by gas cars, while No. 2552 wheels the eight- and ten-car rush-hour trains.

Calling All Cars

★ **Tremendous increase in passenger traffic has brought ingenious methods for more intensive use of coaches.**

By A. C. Kalmbach.

THREE years ago, when I first rode the little branchline mixed train, only four passengers enjoyed the oil-lighted spaciousness of the old arch-windowed combination coach-baggage-car-caboose. But one month ago, 67 passengers climbed aboard at the junction and the Grand Trunk had added a full extra coach to take care of the business. The mainline train from Chicago had four day-coaches instead of two. No. 33, the morning train to Madison, now carries two coaches regularly instead of one. The *Olympian*, the *Sportsman*, the *Texas Special* and many other trains the country over are running regularly in two sections. The Southern Pacific has increased all its mainline trains to the maximum number of coaches practicable to handle, and over and above all this, one-third of all the coaches in the country are always either in troop-train service or on call for troop trains.

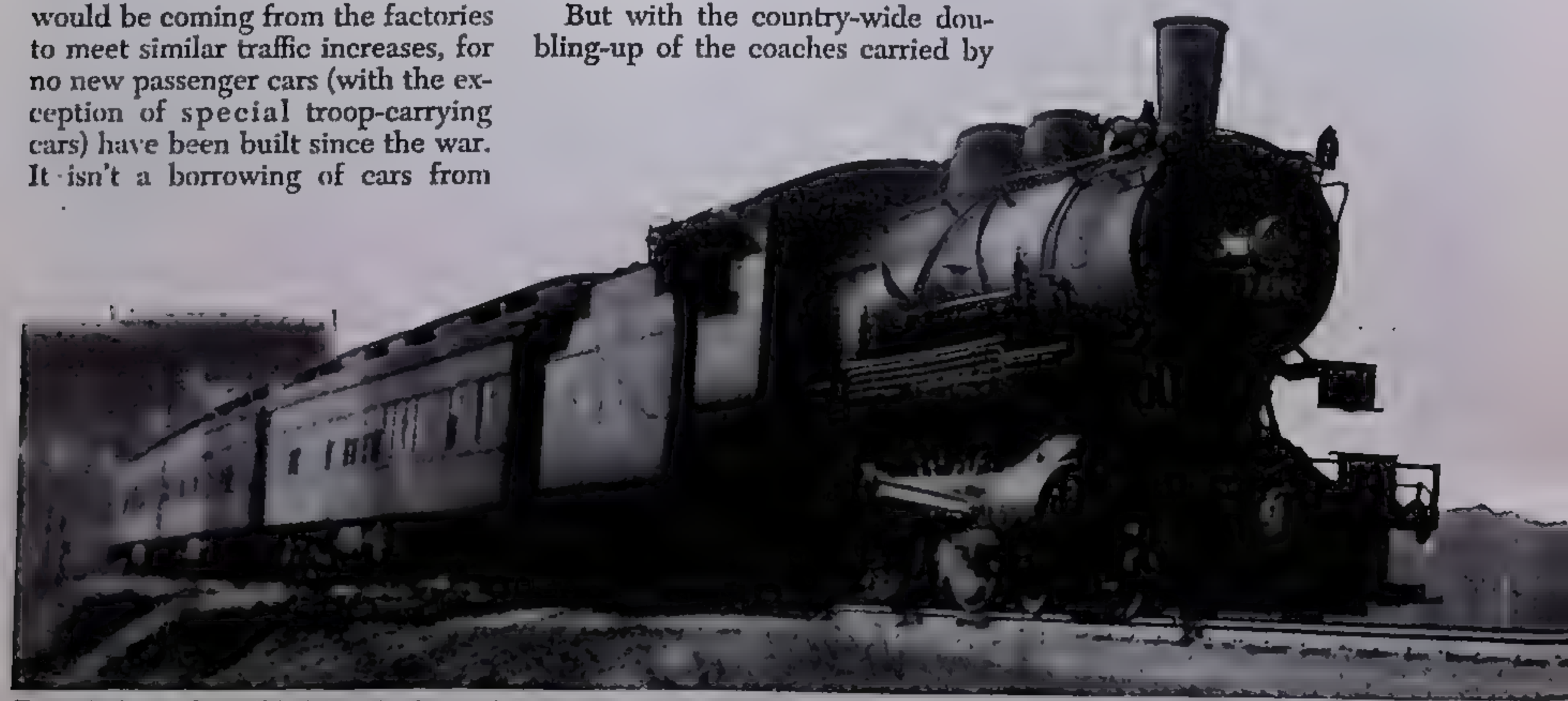
Where do the railroads find all these extra cars? It isn't a supply of new cars which in normal times would be coming from the factories to meet similar traffic increases, for no new passenger cars (with the exception of special troop-carrying cars) have been built since the war. It isn't a borrowing of cars from light trains to pad out the more heavily trafficked trains, for every train has felt the increase in business and the need for more equipment is general, rather than restricted to a handful of through trains. The only solution has been to operate the existing coaches with far greater efficiency, and the successful working out of that problem is one of the most remarkable feats of wartime railroading.

Fortunately, most American railroads had, in the decade before the war, put into service quantities of new, modern coaches. These cars, especially those few which were on order at the time of Pearl Harbor and which were delivered early in the war, eased the situation to some extent. For instance, the New York Central acquired 132 new passenger cars just as the traffic rush was beginning. These included 100 de luxe coaches for use on such through trains as the *Pacemaker* and the *Southwestern Limited*, as well as 32 streamlined stainless-steel cars for the *Empire State Express*. This made available an equal number of coaches of earlier construction for transfer to other trains.

But with the country-wide doubling-up of the coaches carried by practically any train you can name, and the country-wide tripling (and better) of the passenger traffic, the new coaches, and even the former Pullman parlor cars purchased and converted to coaches by individual railroads like the New York Central and Norfolk & Western, are but a drop in the bucket.

Some of the needed cars came out of the reserve of coaches that the railroads once kept on hand for special movements and holiday peaks. There are no such reserves now. All the coaches are in use every day, and when the weekend and holiday peaks come around now, the railroads haven't anything left to throw into the breach. Every day, including Wednesday, seems to be a holiday in a nation of rubber and gasoline restrictions, and everybody is bent on going some place.

All extra services have been cut off. Many coaches have been saved through the elimination of excursion trains and extra coaches for special parties. The usual Summer trains to resorts, and ski trains in Winter, are missing—a wartime casualty; and on some roads, like



Troop trains such as this intensify the need for more coaches. Nansen & Barham, 6022 Hartford St., St. Louis, Mo.

the Illinois Central, relatively nonessential local passenger and mixed trains which had been poorly patronized were discontinued right at the beginning of the war in order to release coach equipment for mainline use. Many cars from other services, such as parlor cars, buffet-lounge cars, bars, combination baggage-car-coaches, have been converted into coaches. The selling of lounge-car seats as parlor-car seats has become fairly general wartime practice.

All these expedients help, but the big source of extra coach capacity has been improvement in operating efficiency. Individual railroads have taken inventory of their passenger equipment, pooled it, and reassigned runs so as to get the most possible mileage out of each unit. The railroads of the country as a whole have done much the same sort of thing through the newly created passenger-car service section of the Association of American Railroads. Coaches are moved about from railroad to railroad with almost the same freedom as box cars.

Just what is the pooling of passenger cars, and how does it save coach-miles? It is much the same thing which has become the accepted practice in the use of locomotives. Several generations ago, each engineer had his own engine. When he went home to sleep the engine stood idle in the roundhouse. He took the engine out on the same train each day and came back on the companion run. But locomotives were too expensive to spend so much idle time, and the pooling system was created by which each engine crew took out the first suitable engine which was ready. Engines were inspected, cleaned and serviced, and back they went to roll up more miles with a different engine crew.

On the other hand, passenger cars, until the war, were usually assigned to particular trains. It was nothing unusual for a set of coaches to make one one-way trip a day, spending all the intervening time idle in coach yards. Perhaps the best illustration of what has been done to improve this situation is the recent establishment by the Burlington of trains 5 and 6 between Dallas and Wichita Falls on the Fort Worth & Denver City line. Train No. 7 from Denver arrives at Dallas at 10:10 p. m. Its companion, train No. 8, leaves Dallas for Denver at 9:15 p. m. Before the war, the coaches arriving in Dallas on train No. 7 laid there 23 hours until the following night, when they returned to Denver. Now, however, these coaches are used as the equipment for trains 5 and 6, making a round trip from Dallas to Wichita Falls and return between 7:45 a. m. and 4:40 p. m.

The situation isn't always so simple, of course. Pooling often requires the use of coaches on quite a number of trains, rotating between the various runs. For instance, the Burlington has created a pool of coaches to take care of the existing train service between St. Louis, Kansas City and Omaha with the least number of cars. The eight daily trains in this service include two between Kansas City and St. Louis, needing two coaches each; two between Kansas City and Omaha, needing two coaches each; and four between Kansas City and Omaha, needing three coaches each. This makes a total of 20 necessary coaches, and yet the entire service is taken care of with a total of 13 coaches. Three sets of two coaches each are assigned to a pool which is scheduled as follows and repeats every three days:

Monday—Leave Kansas City at 11:58 p. m. on No. 23. Arrive Omaha 7:00 a. m.
Tuesday—Leave Omaha at 4:30 p. m. on No. 26. Arrive Kansas City 9:40 a. m.
Wednesday—Leave Kansas City at 8:30 a. m. on No. 27. Arrive Omaha 2:40 p. m.
Wednesday—Leave Omaha at 11:45 p. m. on No. 22. Arrive Kansas City 7:00 a. m.
Thursday—Repeat cycle.

Thus, every three days a set of coaches is used on four trains. The question may arise why the cars which reach Kansas City at 9:40 p. m. are not sent back to Omaha that same night on the 11:58 p. m. train. Some allowance must be made for possible late arrivals and it is also necessary that some time be allowed for cleaning and maintenance operations.

Another Burlington pool of cars rotates in similar fashion between St. Louis, Kansas City and Omaha, and in the three-day cycle the cars involved operate on six trains.

Perhaps the most intensive utilization of coach equipment is on the eastern lines of the Pennsylvania Railroad. Both the New York - Philadelphia and New York - Washington trains of the Pennsylvania operate hourly out of both terminals and carry a tremendous volume of traffic. In prewar days the trains were taken to the yards for servicing, cleaning and turning. Now, however, all this work is done right in the terminals with a total scheduled time between arrival and departure of less than 30 minutes in many cases. The trains are made up in such a way that the consist of an arriving train is suitable for the next departing train, except, perhaps, for the addition or subtraction of a car or two from either or both ends. Thus, switching is kept to a minimum, freeing the yards and saving much time. The effect of this planning, of course, is to increase the efficiency of the coach and Pullman-car fleet engaged in these runs, thus in effect adding to the number of cars available.

Another instance of saving coaches on the Pennsylvania is the shortening of the weekend and holiday run between Philadelphia and Atlantic City. During the warm months this year, the more roundabout service between Broad Street Station in Philadelphia and the seashore resorts was curtailed at times of heaviest travel and the equipment was shifted to the 10-mile-shorter run between the Market Street Ferry wharves in Camden and the Atlantic Coast resorts. The trains were then shuttled back and forth between the terminals as traffic warranted. The net result of this practice was that although one-third fewer coaches were available for service, 50 per cent more passengers were handled.

Fast turn-around on the Burlington.

Have you heard about the quick turn-around of one of the Twin Cities Zephyrs at Minneapolis? It arrives at Minneapolis as No. 21 at 3:45 p. m. daily and leaves Minneapolis as No. 24 at 4 p. m. During this 15-minute period the train is wyed, cleaned inside, windows washed outside, and refueled and rewatered. So far as I know, this is about the quickest turn-around in the country and makes it possible for this Zephyr to make an 874-mile round trip daily between Chicago and Minneapolis.—*Donald Ashton, publicity director, Burlington Lines.*

In addition to borrowing and leasing passenger-train cars from one another, the railroads have been able to add to their coach supply by intensive studies of their requirements and by remodeling equipment, such as parlor cars and the like, into coaches to the extent that this has been feasible. Continuous studies are being made of the utilization of passenger-train equipment for the purpose of eliminating nonessential service, making the equipment available for other service. As an indication of the extent to which this has been done, it is interesting that during the period between January, 1942, and September, 1943, the following equipment was released in this manner:

Locomotives—Steam	196
Other	18
Motor coaches	45
Head-end cars	144
Coaches	412
Parlor cars	79
Sleepers	247
Club, lounge, observation, etc.	117
Dining cars	61
Other passenger-train cars	9

An idea of the lengths to which the railroads have gone to satisfy the demand for coach accommodations may be gained from the fact that on numerous occasions Pullman cars have been operated as coaches during daylight hours when they would otherwise be idling in the yards waiting for their overnight trips. The Pennsylvania employs en route coach-cleaning crews on 120 trains so that the cars can be more speedily fitted for the return trip when they arrive at terminals. The Pennsylvania has also prepared for emergency needs during the periods of the very heaviest travel by placing seats in the baggage compartments of a number of passenger-mail-baggage cars and by rebuilding some former steel automobile boxcars into coaches.

Some railroads have been fortunate enough to find weekend use for commutation cars which were ordinarily used only on work days. The Burlington, for instance, has been using a number of suburban cars on week ends to transport soldiers on furlough between Camp Grant and Camp Ellis and Chicago. The New York Central has employed many multiple-unit electric cars in trains hauled by steam locomotives to such points beyond the electrification as Poughkeepsie and Chatham. These cars are returned to their commuter service at the end of the week end, but their temporary use in this manner has meanwhile released an equal number of standard coaches for extra weekend capacity on through trains.

Add to all the pooling, rescheduling and other devices for the more intensive use of cars, a stepping-up of the repair schedule with the result that the shops of most railroads are now kept fairly well cleared of coaches, and you have the means by which the railroads have been meeting their tremendously increased passenger loads. The bottom of the barrel has been scraped, and although there is difficulty in finding enough space for all the passengers, the problem has been handled well enough to avoid the almost-impossible difficulties of coach-travel rationing.

Baggage compartments now carry passengers.

The Pennsylvania Railroad gained extra passenger-carrying capacity by converting numerous passenger-car combines to full coaches. Photo at left shows one of these cars before conversion; at right, after installation of seats, lighting fixtures and ventilators in the former baggage compartment. Notice the modern circular windows in the now-unused sliding doors.

Courtesy Pennsylvania Railroad.

Collection of John Purdy, Milwaukee, Wis.

No. 1819, C&NW Class Z Consolidation, was a sister of the seven locomotives rebuilt in the Burlington's shops for Mexican service. Originally built by Schenectady from 1909 to 1913, the locos now are trimmed like new—with Spanish lettering and new numbers (below).

U. S. Locos to Mexico

RECONDITIONED and modernized in the shops of the Burlington Route, seven 34-year-old C&NW Consolidation locomotives, which had been retired from yard and transfer service a number of years ago and held for rehabilitation, are going to Mexico to speed the southern republic's contributions of war materials to the Allied cause. The locomotives, built in the years 1909 through 1913, were recently acquired by the United States Government under the lend-lease program and the Burlington was given the job of reconditioning and modernizing them. Three were reconditioned at West Burlington, Ia., and four at Denver.

Each locomotive has been thoroughly overhauled and reconditioned. Both locomotives and tenders were converted from coal to oil fuel, and in addition, new radial buffers, power reverse gears, injectors, hydrostatic lubricators and water columns were installed. The original steam pressure of 185 pounds was retained. Several of the "reclaimed" locomotives already have crossed the Rio Grande.

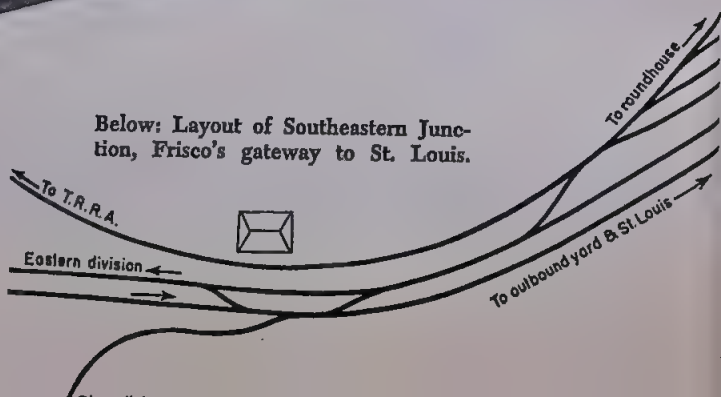
Courtesy Burlington Lines.

Courtesy Burlington Lines.

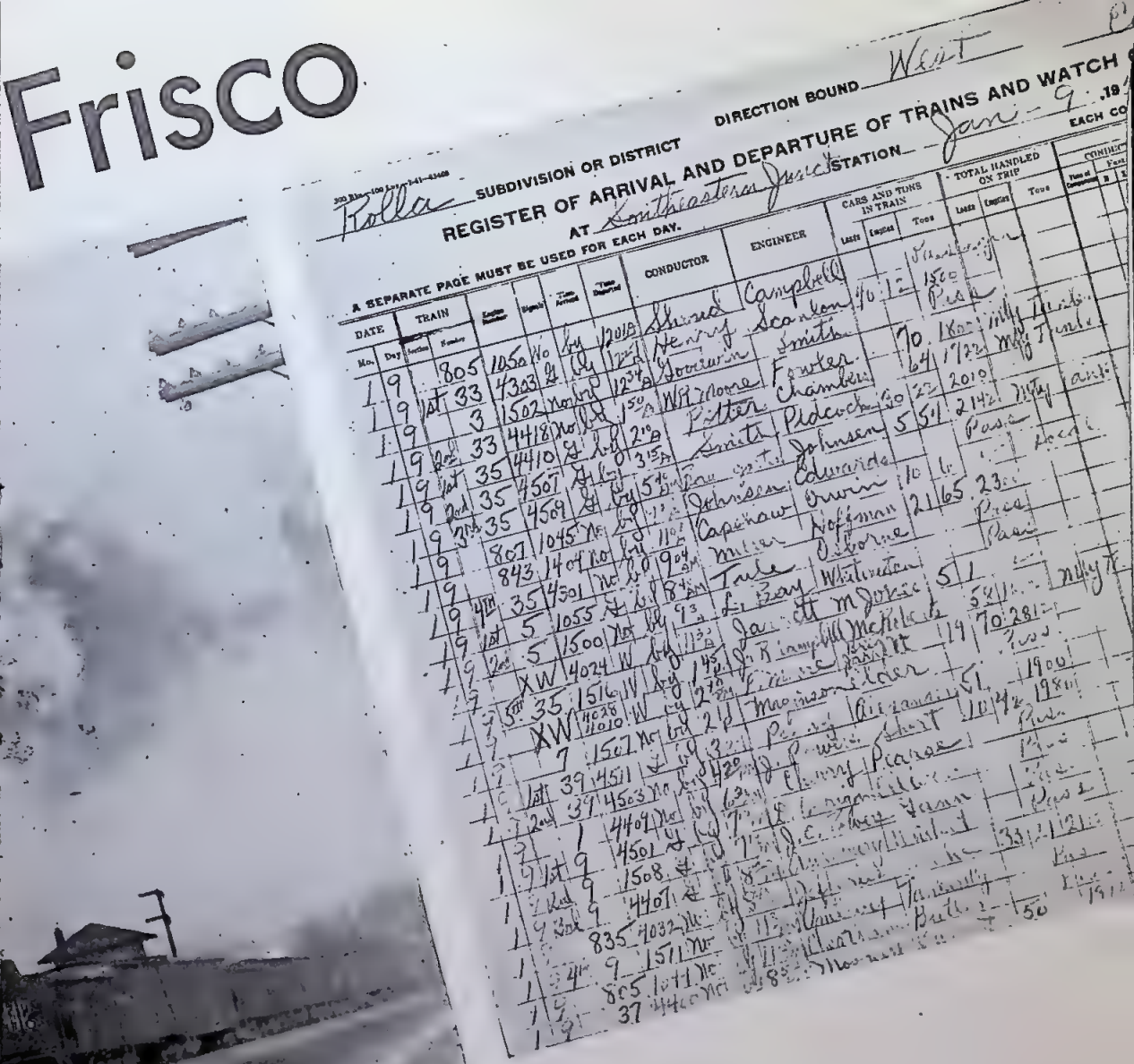
Hot Spot on the

Third 39 at Southeastern Junction. At right is the register sheet for one day, showing trains bound in only one direction on only one of the two divisions. A busy spot!

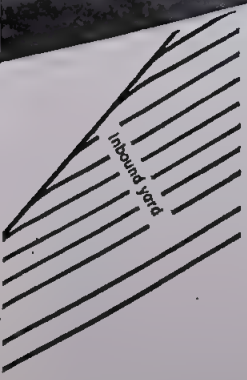
Below: Layout of Southeastern Junction, Frisco's gateway to St. Louis.



Frisco



Illustrated by William Barham.



SOUTHEASTERN JUNCTION, at the city limits of St. Louis, is probably the most important gateway and train-order office on the Frisco Lines. It is just beyond the freight yards and roundhouse, and here the main lines divide with the double-track Eastern Division running to the west to serve Missouri, Arkansas, Kansas, Texas, and Oklahoma, while the single-track River Division turns south toward southeastern Missouri, Arkansas, Tennessee, Mississippi, Alabama, and Florida.

The single operator-leverman is kept plenty busy with train orders for freight trains leaving the yards, occasional train orders which are handed up to passenger trains on the fly, and with the lining up of signals and switches for not only freight and passenger trains but the movement of light engines to and from the roundhouse. The freight and extra passenger locomotives pull up to the tower to get their train orders and then back down to the outbound yard to pick up their trains. Regular passenger engines use the junction to get from the roundhouse out to the main

line, after which they back seven miles to St. Louis Union Station.

The interlocking, which was constructed and put into operation 27 years ago, is a combination of mechanical locking and switch rodding with electrical locks and track circuits. The presence of any train within a mile of the tower is indicated on the track diagram suspended above the interlocking levers, and once a train enters a route no lever affecting that route can be moved until the train has completed its journey through the interlocking. Even if a train does not enter a route which has been cleared, no changes can be made until a three-minute time release has run down after the signal has again been set at stop.

Moving the large levers is strenuous work. Add to this running up and down the stairs (first-trick operator Dougherty says there are 27 steps) dozens of times a day with train orders, and a job at Southeastern Junction means real physical work. Operator Dougherty has seen the Frisco traffic past the Junction grow from 15 trains a day in 1916 to as many as seven passenger trains in 75 minutes today. And there is a long, long parade of fast freight trains outbound at night, inbound in the morning, and an astoundingly continuous string of oil trains.

To allow quicker servicing of engines and thus more efficient use of motive power, the towermen phone the roundhouse and give the numbers and arrival time of all incoming engines so that the roundhouse force can be assigned accordingly and be ready to begin operations.

When the Frisco's big 4-8-2's and 4-8-4's leave the yards and pass the tower they head smack into a hard seven-mile hill, and to hear the engines working down in the corner so as to get a good start on the hill is indeed a sound to delight the ear.

Opposite page: Double-headed engines for extra freight pull into Southeastern Junction to get orders before picking up their train. Above, operator Baskett writes "19" orders in the busy tower. Below, left to right: Operator Graves hoops orders to a freight on the River Division; a view of the tower; Operator Dougherty prepares to set up a route. Notice track diagram.

Conductor M. R. Adams, "captain" of the *Pocahontas*.

The Passenger Conductor

★ He is in charge of the safe movement of train as well as complicated work of ticket collection.

By Chester D. Palmer Jr.

Photos courtesy Norfolk & Western.

As a captain is master at the bridge of a great ocean-going liner, so a conductor is captain of the train and is responsible for the safe and orderly movement of a "ship of the rails" that speeds swiftly over the steel in any and all kinds of weather.

Punching tickets is all the average passenger sees of this job, but, on a trip from Roanoke to Norfolk, I was permitted to see the job in its entirety. Believe me, it's a career. At 10:55 one morning I stepped aboard Norfolk & Western's *Pocahontas,* on which M. R. Adams is conductor. A distinguished looking man is "Cap'n" Adams, a hale and hearty, typical conductor. From him I learned that a good conductor must be congenial, friendly, and at the same time, efficient. Most passenger conductors have worked for their railroads a long time, and by their actions they express a loyalty and devotion for the railroad which comes naturally with 20 or 30 years of service.

"Courtesy is a habit that should become a part of every man who works for the railroad," Mr. Adams remarked. "Courtesy makes a conductor's job successful and pleasant; but it is equally important to everyone who must deal with people in making a living. Every employee is his company's representative, and people judge the company by the attitude and conduct of its employees."

Of course, the conductor must have ability the same as any other worker. It takes dependability to conduct a train safely and "on time." No irresponsible man could stand up to this list of duties:

1. The conductor is in charge of the train and its crew.

2. The safe movement of passengers to destinations is the conductor's principal consideration. (Mr. Adams has been a conductor since 1902 and has never had a fatality on his trains.)

3. He must look after the comfort and well-being of all passengers. (As Conductor Adams pointed out, "I try to treat them all alike, and satisfy all of them, too.")

4. He must take up tickets, getting proper transportation, whether cash fares, tickets, or passes. He sorts all tickets and, with phenomenal memory, knows most of the time where each passenger is sitting and at what station each is to leave the train. The tickets are sent to the auditor-of-revenues department, where they must again be sorted and classified. (Interesting sidelight: Conductors must, on many occasions, remember sleeping-car passengers and see that they get off at the proper stations. This is done without disturbing other patrons.)

5. He must notify the crew of all flag stops.

6. He must watch signals at telegraph offices to make certain the train stops when the operator has orders.

7. He must handle train orders. The conductor and engineer each get a copy so that they may work in harmony in operating the train. The conductor instructs his crew to read orders and everything else pertaining to correct movement of the train.

8. He must assist people on and off the train.

9. He must register before starting the train, when arriving at the terminal, and at certain designated stops along the way.

10. He must watch the conduct of passengers as to safety and as to comfort of other patrons of the train.

At 10:30 on the morning I interviewed Conductor Adams, he registered in the office of Stationmaster E. G. Davis in Roanoke. A few minutes later he went out to the platform and waited for passengers to board the *Pocahontas,* making himself generally helpful to patrons. The train pulled out at 10:55 and Mr. Adams and Trainman Frank Williams started making their way through the coaches to collect tickets.

Conductors generally have good "systems" of keeping track of passengers. "Cap'n" Adams, for instance, punches his tickets in a way that

Between ticket-collecting trips through the train, Conductor Adams works in his front-coach office.

aids him in classifying his passengers as to race and sex. If the passenger is a white woman, he punches the ticket at the top center. If the patron is a white man, he punches the ticket at the bottom center. If the passenger is a colored woman, the ticket is perforated on the left side; a colored man is indicated by perforating the right side. Each conductor has a registered puncher with a different mark so that the auditor's office can always tell the source of any ticket. Mr. Adams' puncher makes a mark like a five-pointed star.

After collecting tickets, he usually sits down at his little work table in the front coach, where he has all his papers and reports in front of him. There he sorts and classifies all tickets and passes, checking over stops and passenger destinations. Then he works on car reports—detailed cards showing what cars he has on that particular train.

At Lynchburg, Conductor Adams had to register. People in the station greeted him with a friendly "Hi, Cap'n," as he swung down from the cars. When the train departed he again went back through the coaches punching tickets. This is the conductor's most routine job because it must be done after every stop along the way. The trainmen help the conductor count the passengers who board the train at each stop, so none are missed.

Mr. Adams registers at Roanoke, Lynchburg, Crewe, Petersburg, and Norfolk on the way down and on the return trip. This is done so that each register stop along the way has a definite written record of trains, arrivals and departures.

After a brief lunch in the diner, Mr. Adams said he had a few minutes to spare, so I fired some questions at him. "First of all," I asked, "I want to know what you consider the greatest duty you have in your job."

Without hesitation he answered, "Safety of my passengers and safety of my train are above everything else!" (There was a proud note in his voice when he said "my passengers." It proclaimed more forcibly than any human utterance that the people who travel on the train

What railroad is it? A quiz.

Which direction is the train going and on what railroad, under the following circumstances:

1. Horseshoe Curve is on the right-hand side.
2. After crossing the Delaware River the train proceeds through the Delaware Water Gap.
3. For many miles Lake Erie can be seen to the right of the train, with nothing much between except a strip of farm land, a highway, and an abandoned interurban line.
4. As the train stops just after crossing the hanging bridge, passengers step off the train for a view of the Royal Gorge.
5. Mount Hood can be seen across the Columbia River from the right-hand car windows.
6. The train pulls through a tunnel into Camden Station, Baltimore.
7. After following the Arkansas River Valley for several hundred miles the train crosses Raton Pass.
8. The train passes over one of the world's largest arch bridges and then through a tunnel into Manhattan.
9. The Pacific Ocean is on the right side of the train for 113 miles.
10. The train glides down Weber Canyon.

The correct answers are on page 46. Score yourself 2 points for each correct direction, 1 point for each correct railroad name. 24 points is a very good score, 19 points average.

UNTIL this war is won, saving minutes here may mean saving lives on distant battlefields — and the railroads are making minutes count.

For every minute of the day and night, they move a million and one-third tons of freight a distance of one mile — most of it military weapons and supplies and the raw materials, the food and fuel necessary to keep production going at top speed.

Every minute of the day and night, the railroads keep track of the movement of 2,000,000 freight cars — marshaling them where they're needed — keeping them moving.

Every minute, day and night, fifteen new freight trains are made up and started on their runs somewhere in America.

Every minute of the day and night, railroad men — modern minutemen — are at work on the biggest job in transportation history — to meet the nation's need.

Railroad work is essential work — war work.

• • •

DECEMBER 10 "CLOSING DATE" FOR CHRISTMAS PACKAGES. This year — when war traffic has first call on all shipping services — it is more important than ever to send your Christmas packages early.

Pack them adequately, wrap and tie them securely, address them right and get them started (to points in the United States and Canada) by *December 10.*

ASSOCIATION OF AMERICAN RAILROADS

ALL UNITED FOR VICTORY

THE TRAIN OF THE FUTURE?

The train of the future may not look in all respects like the artist's conception of it. But when Victory Day arrives, it will be found that America's railroads have amply justified their reputation for vision and progress. They are already busy with plans that will provide finer transportation than the public has even dreamed possible. Rail-fans will find C&EI right up among the leaders.

Chicago & Eastern Illinois Railroad

C&EI

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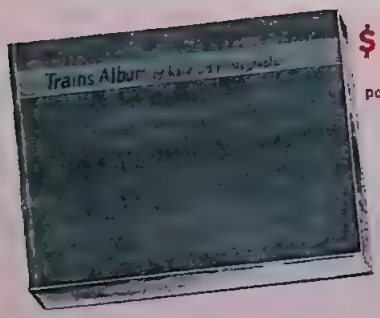

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KALMBACH PUBLISHING CO.

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There are many faces to remember. Punching tickets a certain way helps in identifying passengers later.

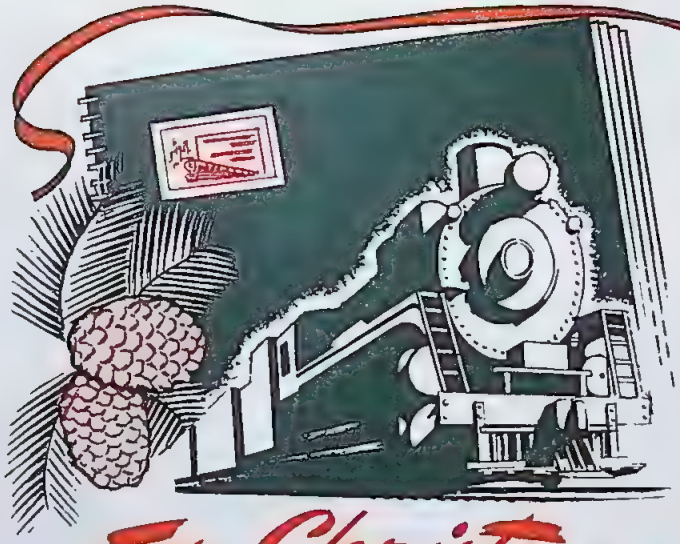
of which he is the conductor have entrusted their lives to his care and that he is determined to carry out the responsibility fully and completely.)

"Don't you ever get tired of working on the train all the time? I don't mean tired of the job or duties, but just generally tired of spending so much time on a train?"

"No, son; I've been here so long now that my job is a part of my life that nothing else could replace. It seems funny, but I never seem to get tired of this job. New faces, old faces, changing faces, and working among people I respect, for a company I admire—these, and true security, are the things, I reckon, that make a man stick right with this job every day and every year. Railroading's a lifetime proposition; you've got to live it like I do to enjoy it."

Along the way to Norfolk, Conductor Adams frequently peered out of the window to see that the train was proceeding safely and according to orders. He is in command of the train and responsible for its safety, so he always keeps careful check on everything. At Crewe we changed engines and crews, but that didn't take much time. When the change was made, Mr. Adams walked to the front of the train and compared time with Engineer E. C. Jenkins to see that their watches were coordinated. They also glanced over train orders together to be assured of perfect cooperation in the safe movement of the train.

Near Burkeville the train passed within 50 yards of Mr. Adams' old boyhood home. The land was purchased in 1888 and Mr. Adams' father built the solid white house that's on it today, still owned by the conductor and his



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Answers to quiz on page 42.

1, Pennsylvania RR., eastbound. 2, DL&W, westbound. 3, New York Central, westbound. 4, D&RGW, westbound. 5, SP&S, eastbound. 6, B&O, south or westbound. 7, Santa Fe, westbound. 8, New Haven, westbound. 9. Southern Pacific, southbound. 10, Union Pacific, westbound.

brother. A little farther along, Mr. Adams went to the door and waved, telling us his sister lives about a half a mile away and waves at him every time his train roars by. These things add the human touch to Mr. Adams' job. He had a warm look in his eye when telling of his sister and his boyhood home.

Just before pulling into Norfolk, Mr. Adams and Trainman Frank Williams were talking about various old personalities on the Norfolk & Western; and the tone of their reminiscences reflected a love of the men who stood for loyalty and faithful service on the railroad. They spoke quietly but proudly of Jube Gerald, well known engineer, who died at his home in Bluefield a few weeks previously.

Along the way, passengers frequently ask Mr. Adams to point out spots of scenic beauty and they often inquire about particular places such as the Peaks of Otter, the Elks National Home in Bedford, Crater Battlefield, and many other points of interest between Roanoke and Norfolk. He knows about them, too, and seems never to tire of answering questions and describing the different places and historic spots along the route.

At 5:20 p. m.—on the dot—we pulled into Norfolk terminal, and Mr. Adams and his crew helped passengers down from the train. After registering out at the yardmaster's office, Mr. Adams changed clothes and went to the hotel where he shares a room with other conductors who come in on opposing runs. He usually goes right to his room, he said, to wash up; and then goes to supper. After supper he sometimes goes to a show, but most of the time he goes back to the room and spends an hour or two reading the evening papers before going to bed. He likes to read current magazines.

At 1 o'clock the next day he was ready to go back to Roanoke, his home city, as conductor on the westbound *Pocahontas*.

Recently Lima delivered to the Southern Pacific Company ten new 4-8-4 General Service locomotives, making a total of sixty Lima 4-8-4's now in service on this railroad.

The dull "battle dress" of these latest Lima 4-8-4's is symbolic of their present wartime duties, just as the highly advanced streamlining and coloring of the 1937 Lima 4-8-4 "Daylights"—the first of this series—was symbolic of the peacetime spirit of progress so characteristic of this great railroad system.

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, O.

New railroad book.

CLEAR THE TRACKS!, by Joseph Bromley. 288 pages, 5½" x 8", $2.75. Published by Whittlesey House, New York City.

HERE are all the good things of railroad fiction, rolled into one—and all true. For this is the autobiography of Joseph Bromley, who became a fireman on the old Black River Line at the age of 16 and earned the right-hand side of a Lackawanna cab before he was 20. That was more than 50 years ago, in what many people like to call the good old days. The standard code of operating rules had not formalized railroading, and engine running was an art at which a man could exercise his individuality.

No melodrama mars the story. Mr. Bromley tells of his early railroad days simply and effectively and with a clear memory for nostalgic detail. A wild run, yes, but Mr. Bromley was just as frightened as you or I would be. Queer characters, of course, but some very homey and likeable ones too, the same mixture of people we meet all the time. A little romance, not too much, some horseplay by the train crews, and now and then an accident of the rather ordinary sort. Sunny Summer Sundays hiking along the Erie Canal, blizzardy Winter days on the road, cockfights in the Richfield Springs roundhouse, six trainmen piled in the two beds of the Utica room (which had an outside door) of a Binghamton hotel. All little things, but skillfully combined to make a most readable picture of the life of a typical railroad man in the perhaps not so good "good old days."

The railway postoffice.

THE railroad is not only the most ecnomical means of mail transport, but between the majority of postoffices is by far the fastest and most dependable. From the center of one city to the center of another the railway postoffice takes the mail, with sorting facilities en route and a minimum of transfer time from railroad station to nearby postoffice. The mailbag pickups by fast-moving mail trains work smoothly and without damage to the mail. This may lack the glamour of fast air transit over long distances, but it does have the workaday romance of day-after-day swift accomplishment on the thousands of routes which are now, and can in the future be, best served by the railway.

MEET ALFRED NELSON

—MAN OF ACTION ON THE IRON ORE FRONT

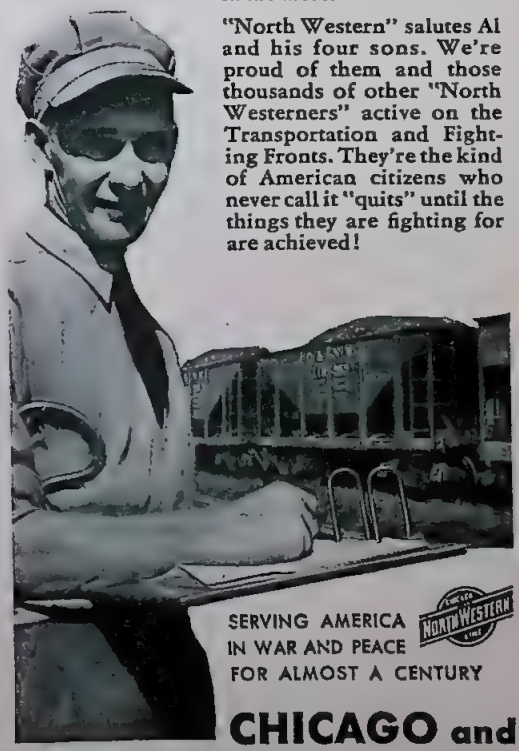
Alfred Nelson, up at Stambaugh, Michigan, is a "North Western" car foreman with a 30-year service record.

Men like Nelson have a deep sense of loyalty. Their country must be served. But Nelson has four other reasons for carrying on—his uniformed sons. Alfred, Jr. is an army lieutenant; Dick is a staff sergeant; Bob's a sergeant in the Coast Artillery; Don is a private first class.

Stationed in the iron ore region, Al is a mighty important man. His uncanny ability to keep rolling stock in top condition helps to move the thousands of ore-laden cars that pass through his yards. And moving iron ore is a *real job*, for this is the precious material from which guns, ships and tanks are made, as well as most other fighting tools needed for victory.

Car Foreman Nelson represents a group of valiant, hard-working, conscientious railroaders. Though far from the fighting front, these men work day and night in freedom's cause. Their vigilance never relaxes—*come what may, they keep vital materials on the move.*

"North Western" salutes Al and his four sons. We're proud of them and those thousands of other "North Westerners" active on the Transportation and Fighting Fronts. They're the kind of American citizens who never call it "quits" until the things they are fighting for are achieved!



SERVING AMERICA IN WAR AND PEACE FOR ALMOST A CENTURY

CHICAGO and NORTH WESTERN LINE

By Edward Hungerford:

The Man in the Tower

READING Joseph Bromley's really fascinating book, *Clear the Tracks!*, brings back to my mind memories, not only of the old Utica & Black River Railroad on which young Joe Bromley first fired a locomotive (the somewhat unruly *Butterfly*), but of a number of other proud and prosperous York State railroads, of which the U&BR was a rather outstanding example. There were other small railroads out of Utica, but, with the exception of the Chenango line south to Binghamton—following the route of the onetime Chenango Canal, afterwards to become a part of the Lackawanna system—none of them were ever particularly prosperous.

Utica always was an important stop on the main line of the New York Central, which passed on the northerly edge of the town. For years, Major Zenas Priest, superintendent of the road's Mohawk Division, made his headquarters in the old station there. To Utica, Major Priest just was the New York Central, nothing less. Almost to the end of his days, he persisted in wearing his Civil War uniform, topped by a small blue cap upon which was plainly printed, in brass letters, the word *Superintendent*. Hats seemed to count a good deal on the Central of the '70's, and they were not all brass hats. George H. Burrows, the remarkable superintendent of the road over at Rochester (later at Buffalo), always sported a tall top hat of the Abraham Lincoln variety. Added to his six-foot-three stature, it made him an impressive figure indeed. At all times he wore that hat. If you found him out in Rochester freight-yard in the middle of a Winter's night, straightening out any old sort of a jam, you still would find him crowned with that remarkable smokestack. He even wore it as he sat at his office desk. Many a doughty engineer, full of vim and vigor and a scrappy soul, cowed at the first sight of the super's great body and head and whiskers under that skyscraping toppiece. Burrows was known always as the hardest disciplinarian on the old Central. Ruthlessly he demoted and fired men, and the top hat was part of the way that he did it.

"He's the best damn railroad man in the United States," Commodore Vanderbilt once said of him, "with but one exception. And I am not quite sure but what he is nearly as good as me."

BUT we have drifted away from Utica and the Utica & Black River Railroad. That little road, from Utica on the Mohawk to Ogdensburgh on the St. Lawrence, 134 miles to the north, and with a branch touching the waters of Lake Ontario at ancient Sackets Harbor, was the real pride of the town. Had not the fortunes of its chief families—the Maynards, the Thorns, the Butterfields—been placed firmly behind it? It made Utica the entrepot of a rich hinterland—a land of apparently inexhaustible natural resources. For 30 or more miles it climbed up over the foothills of the Adirondacks; then, at Boonville, it dropped into the fertile valley of the Black River, which it followed (with its Sackets Harbor Branch) to its mouth. It reached the St. Lawrence at two terminal points: Clayton and Ogdensburgh. At Clayton the road owned its own fleet of river steamers, which reached the gay resorts of the Thousand Islands, then just coming into their own. At Ogdensburgh there was connection with the larger steamboats down the river—to Montreal and beyond.

For a while, the little road had a hard time of it. For years it halted at Boonville, beside the old Black River Canal, which then was a busy waterway indeed, carrying freight in great quantities between the rival entrepot and Carthage. Then it took a fresh breath of life; new capital was poured into it and gradually it was extended north, all the way to the St. Lawrence and over through Watertown to Lake Ontario. Prosperity came to it. Those were the days in which the great papermaking industry in northern New York was being born; the forests of the western Adirondack country apparently were inexhaustible in spruce and other pulpwood. The entire North Country was coming into its great growth. The neat yellow passenger trains of the Black River Road were frequent and well filled. I can well remember seeing them come into the road's new passenger station in Watertown.

WE HAD another, and even larger, railroad in Watertown—the line that found its way up from Rome and Syracuse on the Central. And it also went on to Ogdensburgh, at the foot of lake navigation on the St. Lawrence. This road was the Rome, Watertown & Ogdensburgh, and for many years it was Watertown-owned and -controlled; and regularly it paid its handsome dividends. Its engine shops were in Rome (in those days a center of the locomotive building industry), but its car shops were in Watertown, and I still can remember going past them and seeing behind their windows the bright new cars coming into being. Some of them were parlor cars, and so very handsome were they that Watertown people began to feel their own road quite superior even to the vaunted main line of New York Central far to the south of them.

Then along came Sam Sloan, and at once the picture was different.

The Watertown crowd made a serious mistake. In the '70's the rival town of Oswego, the ancient lake port 60 miles to the southwest, still dreamed of seriously competing with Buffalo as the chief port at the foot of the Great Lakes. The fact that, to reach it from the upper lakes, boats had to make the tedious passage of the Welland Canal between Erie and Ontario did not feaze Oswego. Was it not the nearest of all lake ports to the waters of the Atlantic? Destiny seemed to favor the ancient town. It built great elevators along its harborfront and prepared to do a lake traffic of increasing magnitude.

Then, as sometimes happens, Destiny changed her mind, and gave her heart to the rival port of Buffalo. Two or three fires wiped out most of the elevators on Oswego's waterfront and they were not rebuilt. Oswego was pretty plucky about it all; it did not give up easily. It started to retrieve its fortunes by building a railroad of its own along the south shore of Lake Ontario all the way to Niagara Falls, 172 miles to the west.

This road was known at the outset as the Lake Ontario Shore, and

at outset there was a good deal of huzzah about it. Later there was not so much huzzah. The entire idea was ill-advised. The road for its entire length ran too closely to the powerful New York Central; it could not even hope to compete successfully with it. And in the mid-'70's it was put up for sale on the steps of the old court house in Oswego.

The "Watertown crowd" bought it in—and thereby made its own mistake. The Rome, Watertown & Ogdensburgh had been wallowing in prosperity, paying its 10 per cent annual dividends with no trouble at all. It had plenty of trouble when it absorbed the Lake Ontario Shore, in effect a western extension of the old Oswego Midland, which had a tragic history indeed.

Then it was that Mr. Sloan appeared in the picture.

In his way and in his day he was a very successful railroad operator. He was hard-boiled, ruthless, honest—and very capable. He had taken the old Hudson River Railroad out of the verge of bankruptcy and handed it over to Commodore Vanderbilt a highly profitable enterprise. From the Hudson River he went to the Lackawanna, in those days a railroad that hardly could fail to make money. He had supervised its extension from the anthracite fields of northeastern Pennsylvania into Central New York, by the purchase of the old Chenango Road into Utica and the Syracuse, Binghamton & New York to Syracuse and Oswego. He looked for new fields to conquer.

The Rome, Watertown & Ogdensburgh, already having a hard time of it, with the dead-weight of the Lake Ontario Shore to carry it down, caught his eye. He began buying into it, and at last he had a working control of the property. He transformed all of its locomotives into anthracite-burners, which made a pretty good new customer for his Lackawanna. Then he went much further. He tore out the good rail of the Watertown Road and shipped it south to Binghamton for the extension that the Lackawanna was building into Buffalo. Scrap rail was sent north to replace it. Some of the rail lengths were not more than 10 or 12 feet. Train crews and passengers alike began to be afraid to ride the line.

THEN along came another newcomer into the North Country. His name was Charles Parsons and he was a horse-trader from down in Maine who had had a degree of success in creating some good rail properties in New England. One day he walked into the board meeting of the RW&O in Watertown, uninvited, seated himself at the long table, and calmly announced that he had purchased control of the road and elected himself its president. A confrere from New England, Henry M. Britton, was to be general manager.

Watertown was astounded. If the Black River suddenly had reversed its course and had begun flowing uphill back into the Adirondacks, the town could not have been more excited. It prepared for trouble, but it never had it.

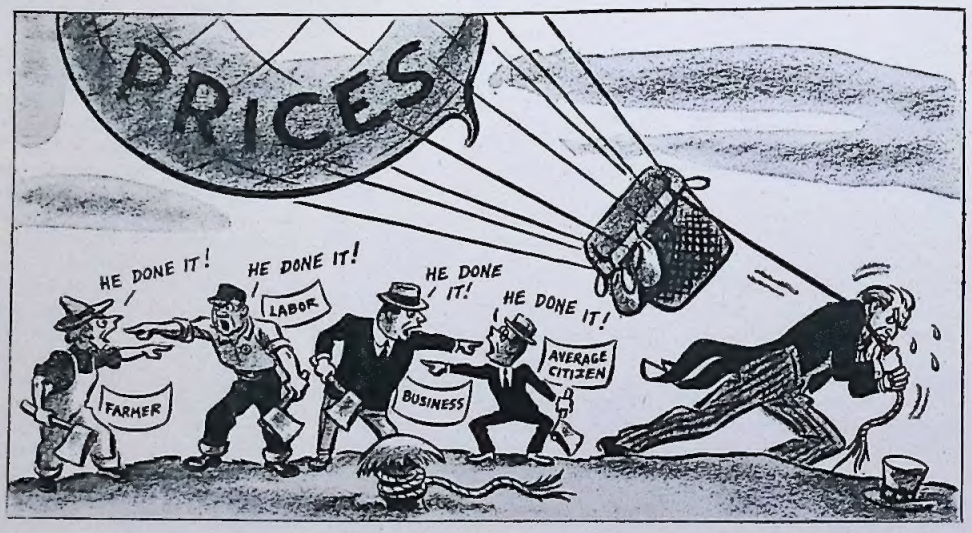
Trouble never feazed Parsons. Nor Britton. The latter was a magnificently capable railroad operator. Between the two men they whipped the RW&O into a first-class railroad once again. They did far more; they reached out and absorbed the prosperous little Utica & Black River. Now they had 600 miles of real railroad—a railroad monopoly in the North Country, swiftly coming to the height of its prosperity. They extended the road north to Massena Springs for connection with the Grand Trunk toward Montreal and the sea; into Rochester; and planned their own independent entrance into Buffalo.

At all of which the Vanderbilts sat up and took notice. Rumors came to them that Parsons was planning to build an extension of the Watertown Road from Utica to Rotterdam Junction, to connect with the Fitchburg and so to create a new workable route all the way across New York State. The Vanderbilts remembered what a pain in the neck the ill-fated West Shore had been to them; what a pretty penny it had cost them to snuff it out. They lost no time in doing business with Parsons. After some skirmishing they accepted his terms and purchased the Rome, Watertown & Ogdensburgh at a fine figure, after which the old eagle from down Maine retired in triumph. It was not every day that one could score over the Vanderbilts.

THE Man in the Tower had intended in this number to tell of many more of the prosperous small railroads of New York—roads like the Buffalo, Rochester & Pittsburgh, the Ulster & Delaware, the Fall Brook, the Delaware & Hudson—perhaps of some of the unprosperous ones, like the West Shore, the Ogdensburgh & Lake Champlain, the Buffalo & Susquehanna, the Shawmut, the Oswego Midland. These will have to go until another time. But they also played their roles in the glamorous rail history of the Empire State. Even in failure, more or less marked, the worse of them did their own good parts in its development. And so they are not to be entirely condemned.

Edward Hungerford

Rome station in 1878, with RW&O train ready to leave.



Never mind "who done it"—pitch in and help get it down!

THIS IS YOUR UNCLE SAM talking—but I'm going to talk to you like a DUTCH uncle, to keep all of us from going broke.

Ever since the Axis hauled off and hit us when we weren't looking, prices have been nudging upwards. Not rising awfully fast, but RISING.

If this keeps up—we're all going to be in hot water.

The government's done a lot to keep prices down. That's what price ceilings and wage controls are for. Rationing helps, too.

But let me tell you this—we're *never* going to keep prices down unless we ALL help—EVERY LAST ONE OF US.

All right, then. Here are the seven rules we've got to follow as GOSPEL from now until this war is over. Not some of them—ALL of them. Not some of us—ALL OF US, farmers, businessmen, laborers, white collar workers!

Buy only what you need. A patch on your pants is a badge of honor these days.

Keep your OWN prices DOWN. Don't ask higher prices—for your own labor, your own services, or goods you sell. Resist all pressure to force YOUR prices up!

Never pay a penny more than the ceiling price for ANYTHING. Don't buy rationed goods without giving up the right amount of coupons.

Pay your taxes willingly, no matter how stiff they get. This war's got to be paid for and *taxes are the cheapest way to do it.*

Pay off your old debts. Don't make any new ones.

Start a savings account and make regular deposits. Buy and keep up life insurance.

Buy War Bonds and hold on to them. Buy them with dimes and dollars it HURTS like blazes to do without.

Start making these sacrifices now—keep them up for the duration—and this country of ours will be sitting pretty after the war . . . *and so will you.*

Uncle Sam

KEEP PRICES DOWN!

Use it up • Wear it out
Make it do • Or do without

This advertisement, prepared by the War Advertising Council, is contributed by this magazine in co-operation with the Magazine Publishers of America.

Correspondence

You will more than likely be interested to know that the ad appearing on the back of the October issue of TRAINS . . . has created considerable attention due to the illustration showing a train being operated on a left-hand track. It is apparent that most people consider Santa Fe an exclusively right-hand-operated railroad, whereas this is not a fact. On a number of divisions we use left-side operations, and, in several locations, operate east and west on either or any of the double or triple tracks. . . . We are certain that there are a great number of double-track railroads in the country that are operating on both the left- and right-side tracks in order to get the great war job done. Most people think only of the North Western as being a left-track railroad.

A. A. Dailey, General Advertising Manager,
Atchison, Topeka & Santa Fe Railway Company.

September 16 inaugurated a new plan to take the Wisconsin Central out of receivership. . . . Although not generally recognized, the WC is a valuable piece of property; its only drawback is that it invariably dangles just outside of the strategic terminals and has to fork over a handsome price for an admission ticket. What a grand slam it would have if it could have retained its original interests in the Grand Central Terminal and yards in Chicago!

Roy Martin, 1509 28th St., Rock Island, Ill.

In a train I rode between Philadelphia and Washington, the first eight cars were from seven different railroads: B&O, NH, N&W, Reading, RF&P, NYC, PRR. I couldn't see all the cars; maybe other roads were represented.

S/2c Kenric M. Miller, U. S. C. G.

Yes, topography contributed to the fame of the Colorado narrow-gauges, but in the same way surrounding country gives any railroad its individuality: through not merely scenery but historical background and reasons for building, type of construction, operation, maintenance, and freight and passenger business actually handled—things, when closely examined, of especial vigor and appeal in Colorado. Too, the experiment of large-scale narrow-gauge systems was tried in that section of the Rockies—an experiment that did its part in installing three-footers in other parts of the country. 'Twould seem to me that the slim tracks of the Columbine State rate a fairly significant spot as common-carriers in our railroad history.

Sgt. Jim Morley, U. S. Corps of Engineers.

The Southern Pacific's Coast Line runs 100 yards back of my barracks, and I saunter out to gaze at a passing freight or varnish several times a day. The *Daylight* is a beauty. I've ridden trains all over the United States and Canada, and none come close to the *Daylight* in comfort and equipment. Those Golden State locos run as smoothly as a banker's sedan. . . . The SP is using every hog available for freight. I've seen Pacifics, Ten-Wheelers, and even Atlantics working doubleheaded; also Mountains and Consolidations. . . . Trains are jammed so badly they now sell only a limited number of tickets even for "unreserved" coach trains. I stood up 5½ hours the last time I went to Frisco.

Cpl. Norman L. Jenkins, U. S. Army.

The article on the New Haven's "Navy" in the August issue reminds me that in 1926 and 1927 I was with the New Haven. . . . Fog was what we watched carefully, and more than 48 hours of bad fog often meant freight moved over the Poughkeepsie River bridge, the L&NE, and down the Delaware River and Belvidere Division of the Pennsy to rejoin the main line at Trenton.

Lt. William C. Moore, U. S. Navy.

Exceptions

If you hesitate to send your friend in service a subscription to TRAINS because of the postoffice ruling requiring a request in writing from the addressee, please read the following exceptions to that rule. If your friend comes under one of these exceptions, no letter of request is required from him.

1. Subscriptions for soldiers with A. P. O. Army camp addresses in the United States. The only A. P. O. points of destination for overseas delivery and therefore the only ones requiring written requests are: New York, San Francisco, Seattle, New Orleans, Miami, and Presque Isle, Me.
2. Renewal subscriptions for overseas soldiers.
3. Official new subscriptions addressed to overseas military units or commanding officers, officers' clubs, etc.
4. Subscriptions for members of the Navy, Marines, or Coast Guard.

Those inocuous little facts that crop up all too frequently in every article in TRAINS take a lot of checking. What is the principal item of freight on the Lackawanna, how many miles of track, *exactly*, has the Chicago, Attica & Southern, and what size are the cylinders of the SP's 4-8-2's? Facts, one after another all day long, and if any of them are at all wrong we surely hear about it from several dozen eagle-eyed readers. So we have to be pretty sure of our research in this word foundry, and that keeps Joe O'Hearn busy. Joe is the genial Irishman who presides in our reference library behind a desk piled high and shelves full of thousands of well organized facts of every sort. Joe writes hundreds of letters every month to confirm items for issues of TRAINS which are in preparation, and we imagine some of the people to whom he writes think he's too insistent when it gets near deadline time. But all this letter-writing and fact-finding has helped plenty in building up a wonderful reputation for TRAINS in only three years.

The new Trains Railroad Map of Colorado is a knockout, much better than even the excellent Pennsylvania map we published last year. It is larger, 24 x 38 inches, and in four colors. Every line, existing or abandoned, is shown, and 14 interesting areas are inset in detail. The price is only $1 postpaid.

TRAINS is planning for postwar days when paper, copper, and other restrictions are lifted. You'll see more magazine, more color, and new processes of reproducing pictures. Every War Bond purchased makes Victory closer, and believe us, we want it as soon as possible and so, we know, do you.

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Trains

A Missouri Pacific 4-8-4 gets under way. The 2100-series 4-8-4's were rebuilt by the railroad from its 25 2-8-4 locomotives.

Courtesy Missouri Pacific.